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## THAT WHICH IS CLAIMED IS:

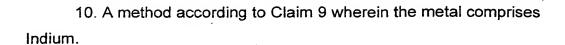
7. A method of bonding two components, the method comprising: positioning the components relative to one another to obtain a desired orientation; and

bonding the two components in the desired orientation with/metal wherein a temperature of both components is maintained below a melting temperature of the metal while bonding.

- 2. A method according to Claim 1 wherein bonding comprises plating the metal on the two positioned components.
  - 3. A method according to Claim 1 wherein bonding comprises electroplating the metal on the two components.
  - A method according to Claim 1 wherein bonding comprises electroless plating the metal on the two components.
  - 5. A method according to Claim 1 wherein bonding comprises providing an electrophoretic coating on the two components wherein the electrophoretic coating comprises the metal and dielectric particles.
- 6. A method according to Claim 1 wherein bonding comprises providing particles of the metal on the two components and bonding the metal particles.
  - 7/A method according to Claim 6 wherein each of the particles of the metal comprises a dielectric material coated with the metal.
  - 8. A method according to Claim 6 wherein bonding the metal particles comprises allowing diffusion between the metal particles.
    - 9. A method according to Claim 8 wherein the metal comprises a metal having a relatively high diffusion rate at room temperature.

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- 11. A method according to Claim 8 wherein providing the particles of the metal comprises providing the particles of the metal with a dielectric coating thereon and wherein bonding the metal particles is preceded by rupturing the dielectric coatings.
- 12. A method according to Claim 11 wherein rupturing the dielectric coatings comprises passing an electric current through the particles.
  - 13. A method according to Claim 8 wherein the metal comprises a first metal with a first rate of diffusion and wherein the particles comprise a coating of a second metal with a second rate of diffusion wherein the second rate of diffusion is lower than the first rate of diffusion.
  - 14. A method according to Claim 13 wherein the first metal comprises Indium and the second material comprises Copper.
  - 15. A method according to Claim 8 wherein providing the particles of the metal comprises providing the particles of the metal with a coating of a solid material that sublimes at a bonding temperature less than the melting temperature of the metal.
- 16. A method according to Claim 15 wherein the solid material comprises one of naphthalene or carbon dioxide.
  - 17. A method according to Claim 8 wherein providing the particles of the metal comprises providing the particles of the metal with <u>a diffusion barrier</u> thereon and wherein bonding the metal particles is preceded by rupturing the diffusion barrier.
  - 18. A method according to Claim 6 wherein providing the particles of the metal comprises vibrating the metal particles apart from the components,

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and after positioning the components, applying the metal particles to the components.

- 19. A method according to Claim 6 wherein bonding the metal particles
  comprises passing an electrical current through the metal particles sufficient to weld interfaces thereof.
  - 20. A method according to Claim 6 wherein providing the particles comprises providing the particles in a foam and wherein bonding the metal particles comprises collapsing the foam.
  - 21. A method according to Claim 6 wherein bonding the metal particles comprises introducing a liquid species that amalgamates with the particles at a bonding temperature less than the melting temperature of the metal.
  - 22. A method according to Claim 21 wherein the metal comprises silver and the liquid species comprises mercury.
  - 23. A method according to Claim 6 wherein bonding the metal particles comprises corroding the metal particles.
  - 24. A method according to Claim 23 wherein corroding the metal particles comprises oxidizing the metal particles.
- 25. A method according to Claim 24 wherein corroding the metal particles comprises galvanically corroding the metal particles.
  - 26. A method according to Claim 6 wherein bonding the metal particles comprises applying pressure to the metal particles.
  - 27. A method according to Claim 6 wherein bonding the metal particles comprises plating a metal thereon.

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- 28. A method according to Claim 6 wherein bonding the metal particles comprises providing a solution of a second metal on the metal particles to initiate a displacement reaction.
- 5 29. A method according to Claim 1 wherein positioning the components is preceded by:

providing particles of a metal on at least one of the components and vibrating the particles;

wherein positioning the components comprises positioning the components while vibrating the particles; and

wherein bonding the two components comprises ceasing vibrating the particles.

- 30. A method according to Claim 1 wherein a first one of the components comprises a substrate.
  - 31. A method according to Claim 30 wherein a second one of the components comprises one of a micro-electronic component, a micro-optical component, or a micro-mechanical component.

32. A method according to Claim 30 wherein the substrate comprises one of a dam thereon or a well therein.

33. A method according to Claim 1 wherein a temperature of the metal
 is maintained below a melting temperature of the metal while bonding.

34. A metallically bonded structure comprising:

first and second components; and

- a plurality of bonded metal particles providing bonding between the two components.
  - 35. A structure according to Claim 34 wherein each of the metal particles comprises a dielectric material coated in the metal.

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- 36. A structure according to Claim 34 wherein each of the bonded metal particles comprises a corroded layer thereon wherein the corroded layer of adjacent particles provides bonding therebetween.
- 5 37. A structure according to Claim 36 wherein the corroded layer comprises an oxide of the metal.
  - 38. A structure according to Claim 36 wherein the corroded layer comprises a galvanically corroded layer.
  - 39. A structure according to Claim 34 wherein the first component comprises a substrate.
  - 40. A structure according to Claim 39 wherein the second component comprises one of a micro-electronic component, a micro-optical component, or a micro-mechanical component.
  - 41. A structure according to Claim 34 wherein adjacent metal particles are bonded at interfaces therebetween with voids remaining between metal particles.
  - 42. A structure according to Claim 41 wherein adjacent metal particles have a metal to metal contact at a bonding interface therebetween and wherein at least one of the metal particles comprises a dielectric layer on a portion thereof.
  - 43. A structure according to Claim 34 wherein adjacent metal particles are bonded by layers of corrosion thereon.
- 30 44. A structure according to Claim 43 wherein the layers of corrosion comprise an oxide of the metal.
  - 45. A structure according to Claim 43 where the layers of corrosion comprise galvanic corrosion.

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- 46. A structure according to Claim 43 wherein the metal particles comprises a metal with high diffusion rate at room temperature.
- 5 47. A structure according to Claim 46 wherein the metal particles comprise indium.
  - 48. A structure according to Claim 34 wherein the bonded metal particles comprises a first metal, the structure further comprising:
- a plated layer comprising a second metal between bonded metal particles wherein the second metal and the first metal are different.
  - 49 A metallically bonded structure comprising: first and second components; and

a metal layer between the first and second components wherein the metal layer provides bonding between the two components and wherein the metal layer extends onto a portion of the second component opposite the first component.

- 50. A structure according to Claim 49 wherein the metal layer comprises a plurality of bonded metal particles.
- 51. A structure according to Claim 49 wherein the metal layer includes dielectric particles therein.
- 52. A structure according to Claim 49 wherein the metal layer comprises an amalgam.
- 53. A structure according to Claim 52 wherein the amalgam comprises silver and mercury.
  - 54. A structure according to Claim 49 wherein the first component comprises a substrate.

55. A structure according to Claim 54 wherein the second component comprises one of a micro-electronic component, a micro-optical component, or a micro-mechanical component.

5 56. A micro-structure comprising:

a substrate;

- a micro-component positioned relative to the substrate; and
- a plurality of metal particles adjacent both the substrate and the microcomponent.

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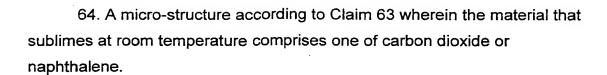
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- 57. A micro-structure according to Claim 56 wherein the metal particles are bonded to one another.
- 58. A micro-structure according to Claim 56 wherein at least one of the metal particles comprises a dielectric material surrounded by a metal layer.
- 59. A micro-structure according to Claim 56 wherein at least one of the metal particles comprises a diffusion barrier thereon.

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60. A micro-structure according to Claim 59 wherein at least one of the metal particles comprises a first metal having a first diffusion rate and wherein the diffusion barrier comprises a surface layer of a second metal having a second diffusion rate wherein the first diffusion rate is higher than the second diffusion rate.

- 61. A micro-structure according to Claim 59 wherein the diffusion barrier comprises a dielectric layer on the metal particle.
- 62. A micro-structure according to Claim 61 wherein the diffusion barrier comprises an oxide layer.
  - 63. A micro-structure according to Claim 59 wherein the diffusion barrier comprises a layer of a material that sublimes at room temperature.



- 65. A micro-structure according to Claim 56 wherein the metal particles comprise a metal that forms an amalgam when exposed to a dissimilar liquid metal species at a temperature less than the melting temperature of the metal.
- 10 66. A micro-structure according to Claim 65 wherein the metal comprises silver.
  - 67. A micro-structure according to Claim 56 wherein the micro-component comprises one of a micro-electronic component, a micro-optical component, and/or a micro-mechanical component.